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Is the Rate of Profit Falling?

THE PRETAX net rate of return on corporate capital reached a thirty-year low in 1974 of only 6.4 percent, according to the estimates that we develop in this paper. Although profits have rebounded substantially since then, there is still a widespread suspicion that the rate of profit may have been declining over a number of years. A primary purpose of this paper is to use the new official estimates of profits, capital consumption, and the capital stock to assess whether such a decline has in fact occurred.

In a widely cited paper written a few years ago, William Nordhaus concluded that the rate of profit has been falling and attributed this decline to the higher capital intensity that resulted when investors shifted funds into the corporate sector because their perception of the risk of such investment declined.[1] Important revisions in the national income accounts data on profits and in the corresponding estimates of the capital stock have become available since Nordhaus did his work. Moreover, Nordhaus' conclusion was based on his visual inspection of the data and not on any for-

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1. William D. Nordhaus, "The Falling Share of Profits," *BPEA, 1:1974*, pp. 169–208. For related discussions of changing profits, see Arthur M. Okun and George L. Perry, "Notes and Numbers on the Profits Squeeze," *BPEA, 3:1970*, pp. 466–72, and Charles L. Schultze, "Falling Profits, Rising Profit Margins, and the Full-Employment Profit Rate," *BPEA, 2:1975*, pp. 449–69.

mal statistical tests. We therefore believe it is useful to reexamine the question with the help of the new data and of some explicit statistical tests.

Our second purpose is to provide an estimate of the pretax rate of return that the nation can earn on additional private corporate investment. This national rate of return on private investment should be a key to the question of whether the rate of capital accumulation in the United States has been "too low."[2] It should also be a critical parameter in the cost-benefit analysis of public projects that divert funds from private investment through either borrowing or taxation. As such, the estimated pretax return on private investment should influence energy and environmental policies.

The estimates that we present relate only to nonfinancial corporations. The national rate of return on capital in unincorporated activities—housing, agriculture, energy exploration, and so on—differs from the return on corporate activities for many reasons. The corporation tax drives a wedge between the pretax and after-tax yields in the corporate sector which would in itself make the pretax corporate rate higher than the noncorporate rate. This difference is attenuated to the extent that marginal corporate investment is financed by debt and to the extent that retained earnings avoid the personal income tax. The investment tax credit and other forms of accelerated depreciation may also differentially benefit corporate investment while property taxes fall more heavily on unincorporated activity. Against this is the specially favorable tax treatment of investment in owner-occupied housing.[3] On balance it is difficult to know to what extent the tax laws cause the return on corporate investment to exceed returns elsewhere.[4] A second reason for a higher yield on capital in

2. See Martin Feldstein, "Does the United States Save Too Little?" *American Economic Review,* vol. 67 (February 1977), pp. 116–21, and, more generally, Feldstein, "National Saving in the United States," in American Assembly, *Capital for Productivity and Jobs* (Prentice-Hall, 1977), pp. 124–54.

3. Investment in owner-occupied housing may, however, be subject to borrowing constraints that prevent the yield from falling as much as the tax differential would suggest.

4. One of us remarked elsewhere that, "since these differences in rates of return are largely a reflection of deliberate tax policies, they may to some extent reflect the government's perception that some apparently low yielding investments deserve subsidy because of social externalities. The most obvious case is the subsidy of state and local borrowing for the provision of public services. Housing may be subsidized vis-à-vis corporate investment because of presumed neighborhood externalities, etc. Dr. Pangloss would say that all social rates of return when properly measured to include externalities have been equalized by a wise tax policy." See Feldstein, "National Saving in the United States," p. 140.

unincorporated activities relative to the corporate sector is their inherently greater risk because they do not enjoy limited liability, and therefore must offer investors a high expected rate of return as compensation.[5] It is difficult to know whether the net result of the tax effect and the risk effect is to make the return on unincorporated capital higher or lower than the returns that we calculate on corporate capital.

Finally, we should emphasize that our analysis deals only with *pretax* rates of return. This is appropriate in view of our concern with the return that the nation earns on private investment. To understand the saving and portfolio behavior of individual investors, it would, of course, be necessary to examine the after-tax rate of return.[6]

Estimated Rates of Return

The title of this paper is something of a misnomer. We analyze the *total* return to capital, including both profits and interest payments. By the "rate of profit" or the "rate of return," we shall mean the ratio of "profits plus interest payments" to the total value of real capital including fixed capital, inventories, and land. The analysis relates only to nonfinancial corporations. Profits exclude earnings repatriated from abroad, and the value of capital excludes capital used abroad.

We have analyzed two conceptually different rates of return. The *net rate of return,* which we shall denote r^N, is based on a measure of profits net of *depreciation* and a net capital stock (K^N) defined in an analogous way. The *gross rate of return,* which we denote r^G, relates operating profits to a gross capital stock (K^G) net of the scrapping of old capital goods. Each definition is the appropriate way to measure the internal rate of return on invested funds if actual output and capital decay take a par-

5. It might be argued that we should be interested in the "certainty equivalent" yields on all investments. If so, this correction for the risk premium should be limited to the portion of yield received after tax by investors. The tax receipts effectively pool the individual uncertain yields. The higher expected yield on noncorporate investment that reflects its greater risk therefore corresponds to a greater certainty equivalence in the national yield.

6. Daniel M. Holland and Stewart C. Myers, "Trends in Corporate Profitability and Capital Costs" (Massachusetts Institute of Technology, 1977; processed), deals primarily with the after-tax returns to investors. There is a brief discussion of pretax rates of return but no explicit statistical analysis of the type that we present below. Their general conclusions agree with our own but they consider a more limited range of issues about pretax returns in order to devote most of their attention to the after-tax return.

ticular form; the net return (r^N) corresponds to exponential decay of the capital stock and of output, while the gross return (r^G) corresponds to the scrapping of capital goods that remain fully productive until they are scrapped (like light bulbs). The appendix demonstrates this correspondence. The two measures together therefore approximate the internal rate of return corresponding to the actual but more complex form of output and capital decay.[7]

Consider the measurement of the net rate of return in more detail. We define

$$r_t^N = \frac{\pi_t^N + INT_t}{K_t^N + INV_t + L_t}, \tag{1}$$

where

π_t^N = net profits of nonfinancial corporations in year t

INT_t = total net interest paid by these corporations in year t

K_t^N = the value of the net fixed capital stock at the end of year t

INV_t = the value of inventories at the end of year t

L_t = the value of land at the end of year t.

All of these values are measured in current prices.

The value of π_t^N is defined as operating profits before any capital consumption allowance minus the estimated value of depreciation.[8] Operating profits exclude any increase in the value of inventories as well as any capital gains that result from changes in the price of fixed capital or land relative to the price of consumption goods. The value of depreciation represents the new Department of Commerce estimate of "economic depreciation" at replacement cost, a welcome improvement over the old procedure of using tax-accounting measures of depreciation at historic cost.[9]

7. The specific methods used by the Department of Commerce cause further problems. Straight-line depreciation rather than exponential depreciation is used for r^N. The scrapping patterns are based on empirical distributions that may now be out of date.

8. Note that net profits are pretax—that is, they are net of depreciation but not net of tax. The source of our data is "Alternative Estimates of Capital Consumption Allowances and Profits of Nonfinancial Corporations, 1929–75," *Survey of Current Business*, vol. 56 (March 1976), pp. 53–56.

9. The estimate of "economic depreciation" is still relatively crude. Depreciation is calculated by applying a "straight-line" formula based on 85 percent of *Bulletin F* lives to a large number of types of goods and then aggregating the results. Although this is obviously not true economic depreciation by any definition, it avoids the serious systematic biases of the old method.

The net stock of fixed capital (K_t^N) is calculated by revaluing the previous stock (K_{t-1}^N) at current prices, subtracting "economic depreciation," and adding current investment. The value of K_t^N was recently estimated for nonfinancial corporations by John Musgrave for the Department of Commerce.[10] The value of inventories (INV_t) is the current market value of inventories, based on net inventory investment plus the revaluing of existing stocks according to the prices of the output of nonfinancial corporations.[11] The value of land (L_t) is the most problematic component of the total value of the capital input; it rests on benchmark data for selected years and estimates for other years by Edward Denison on the basis of the value of structures.[12]

The gross rate of return is defined analogously as

$$r_t^G = \frac{\pi_t^G + INT_t}{K_t^G + INV_t + L_t}, \tag{2}$$

where π_t^G is the gross profits of the nonfinancial corporations and K_t^G is the value of the gross fixed capital stock at the end of year t. Gross profits are defined as operating profits before capital consumption allowances. The gross capital stock (K_t^G) is calculated by revaluing the previous stock (K_{t-1}^G) at current prices, subtracting an estimated value of "scrapped" capital goods, and adding investment. This "scrappage" is estimated as a current-dollar replacement cost and is based on the Winfrey S-3 distribution of scrapping dates for individual classes of goods.[13]

Table 1 presents the estimated net and gross rates of return for the years 1948 through 1976.[14] Both measures imply an average rate of return of approximately 11 percent for the period as a whole; more specifically, the

10. John C. Musgrave, "Fixed Nonresidential Business and Residential Capital in the United States, 1925–75," *Survey of Current Business,* vol. 56 (April 1976), pp. 46–52; updated in ibid. (August 1976), p. 64.

11. We are grateful to John Gorman for providing these unpublished data.

12. See Edward F. Denison, *Accounting for United States Economic Growth, 1929–1969* (Brookings Institution, 1974).

13. A more detailed description of this probabilistic scrapping model is presented in U.S. Department of Commerce, Office of Business Economics, *Fixed Nonresidential Business Capital in the United States, 1925–1970* (National Technical Information Service for OBE, 1971). New estimates by the Department of Commerce of capital consumption were published in "Alternative Estimates of Capital Consumption Allowances."

14. These figures involve several revisions of the preliminary estimates cited in Feldstein, "Does the U.S. Save Too Little?" In particular, both profits and the capital stock have been recalculated using the revised estimates of capital consumption.

Table 1. Annual Rates of Return on Nonfinancial Corporate Capital, 1948–76[a]

Percent

Year and period	Actual: Net r^N	Actual: Gross r^G	Cyclically adjusted: Net r^N	Cyclically adjusted: Gross r^G
1948	13.3	11.9	13.64	12.11
1949	11.6	11.0	13.30	12.05
1950	13.1	12.0	13.44	12.21
1951	13.2	12.3	12.18	11.67
1952	11.5	11.2	10.82	10.78
1953	10.9	10.9	10.22	10.48
1954	10.3	10.6	9.28	11.23
1955	12.4	11.9	12.40	11.90
1956	10.6	10.9	10.94	11.11
1957	9.8	10.5	10.48	10.92
1958	8.5	9.7	10.54	10.96
1959	10.7	11.1	11.89	11.84
1960	9.9	10.6	11.60	11.65
1961	9.8	10.6	11.50	11.65
1962	11.2	11.6	12.22	12.23
1963	11.9	12.0	12.92	12.63
1964	12.8	12.6	13.48	13.02
1965	13.7	13.2	13.70	13.20
1966	13.4	13.2	12.72	12.78
1967	11.9	12.2	11.53	11.97
1968	11.7	12.1	11.36	11.89
1969	10.2	11.1	9.86	10.89
1970	8.1	9.7	9.12	10.33
1971	8.4	9.9	9.42	10.53
1972	9.2	10.4	9.54	10.61
1973	8.6	9.9	8.26	9.69
1974	6.4	8.4	8.10	9.45
1975	6.9	8.9	10.30	11.00
1976	7.9	9.7	10.28	11.17
Average				
1950–59	11.1	11.1	11.2	11.3
1956–65	10.9	11.3	11.9	11.9
1960–69	11.7	11.9	12.1	12.2
1966–75	9.5	10.6	10.0	10.0
1948–76	10.6	11.0	11.2	12.2
1948–69	11.5	11.5	11.8	12.8
1970–76	7.9	9.6	9.2	10.4

Sources: Derived from conventional data, including the 1976 national income accounts revision, using equations, methods, and specific sources described in the text.

a. All rates of return are before tax and are based on interest paid as well as on profits. The net rates of return (r^N) relate capital income net of depreciation to the net capital stock. The gross rates of return (r^G) relate capital income before depreciation to the gross capital stock. All rates of return exclude real capital gains. Rates are cyclically adjusted using equations 2.7 and 2.8 of table 2. See text for other detailed definitions.

mean value of r^N since 1948 has been 10.6 percent, while the mean value of r^G has been 11.0 percent. The decade averages presented at the bottom of the table show rates of return between 11 and 12 percent for the 1950s and the 1960s but lower rates for the overlapping decades of 1956–65 and 1966–75. For the 1970s alone, the average rates of return were a very low 7.9 percent for r^N and 9.6 percent for r^G.

The rates of return shown in table 1 exhibit a strong cyclical pattern. By either measure, the rate of return fell substantially from high levels in 1948–51 to a trough in 1957–58. It then recovered gradually over the next decade, reaching a new high in 1965–66. The subsequent decade saw a gradual decline, to the postwar lows of 1974. The recovery in 1975 and 1976 has been strong but the current level is still well below the postwar averages. (The cyclically adjusted rates of return will be explained below.)

Before turning to explicit analysis of these rates of return, we can comment briefly on the implication of ignoring real capital gains. Real capital gains and losses accrue to the owners of capital whenever the market price of plant and equipment, land, and inventories rises relative to the price of consumer goods.[15] Although individual investors can in principle realize these gains by selling their ownership claims, society as a whole cannot realize such gains.[16] We have therefore excluded them in all of our analyses. Including such capital gains would raise the average net rate of return for the period 1948 to 1976 from 10.6 to 10.8 percent. For the average gross rate of return, the increase is from 11.0 to 11.3 percent.

Trends in the Rate of Return

The statistical analysis reported in the remainder of this paper provides no support for the view that a gradual downward trend underlies the year-to-year variations in observed rates of return. Although the evidence indicates that the 1970s have seen unusually low rates of return, there is no reason to believe that this fall is more than temporary.

15. Although *equity* capital owners enjoy a *real* capital gain whenever the general price level rises because the real value of the corporate debt is reduced, this gain is exactly offset by the real capital loss that accrues to owners of debt, so that there is no *net* effect for capital as a whole. This is complicated by the taxation of nominal capital gains; some of the real capital gain thus accrues to the nation as a whole rather than solely to owners of capital.

16. An exception would occur if the assets (or the claims to them) are sold to foreign buyers from whom additional consumption goods can then be bought.

The basic evidence on trends in the rate of return is presented in table 2. In none of the equations is the time-trend variable significantly different from zero by conventional statistical standards. The possibility of a time trend warrants further consideration only because of the importance of the question and the relatively large magnitudes of some of the coefficients.

The simplest equation, 2.1, in which the rate of return is related only to a time trend, implies that the net rate of return has fallen 0.14 percentage point a year. Although the coefficient is not significantly different from zero, at face value it implies that the rate of return falls by about one-eighth of its value in a decade. The corresponding equation for the gross return (equation 2.2) has a coefficient only half as large and not greater than its standard error. Taken by themselves, these equations do not resolve the issue; the estimates are consistent with a gradual trend but also with the absence of any trend.

The rate of profit varies cyclically. When the rate of capacity utilization is high, overhead costs are spread over a large volume of output and profits are high; conversely, when the capacity-utilization rate is low, overhead costs absorb a larger fraction of revenue and profits are correspondingly lower. Adjusting the rate of return for variations in capacity utilization therefore helps to assess the extent of the pure time trend. Because there is no measure of the capacity-utilization rate for all nonfinancial corporations, we present some estimates for manufacturing only and others for the economy as a whole.

Revisions in the Federal Reserve Board's measure of capacity utilization in manufacturing (CU) substantially increased previous estimates of the utilization rate for recent years.[17] Equations 2.3 and 2.4 show that variations in capacity utilization do have substantial effects on the rate of return. According to equation 2.3, an increase in capacity utilization from 80 to 90 percent would raise the net rate of return by 1.7 percentage points. Similarly, equation 2.4 shows that such an increase in capacity utilization would raise the gross rate of return by 1.0 percentage point. It is clear, however, that this adjustment for capacity utilization does not change the basic evidence about the time trend.[18] The time-trend coeffi-

17. See "New Estimates of Capacity Utilization: Manufacturing and Materials," *Federal Reserve Bulletin*, vol. 62 (November 1976), pp. 892–905.

18. In a preliminary stage of this research, which used the unrevised Federal Reserve Board index of capacity utilization (as well as somewhat earlier estimates of profits), the adjustment for capacity utilization in manufacturing had a substantial effect on the estimated trend in rates of return.

Table 2. Trends in the Rate of Return on Nonfinancial Corporate Capital, 1949–76[a]

		Independent variable[c]				Regression statistic	
Equation	*Dependent variable*[b]	*Time*	*CU*	*CUW*	*GAP*	ρ	*Standard error*
2.1	r^N	−0.14 (0.09)	...	...	...	0.70	1.20
2.2	r^G	−0.07 (0.07)	...	...	...	0.73	0.79
2.3	r^N	−0.13 (0.08)	0.17 (0.04)	...	...	0.72	0.91
2.4	r^G	−0.06 (0.05)	0.10 (0.03)	...	...	0.74	0.63
2.5	r^N	−0.18 (0.10)	...	0.14 (0.03)	...	0.77	0.96
2.6	r^G	−0.09 (0.07)	...	0.09 (0.02)	...	0.78	0.65
2.7	r^N	−0.07 (0.08)	...	...	0.34 (0.07)	0.75	0.89
2.8	r^G	−0.02 (0.06)	...	...	0.21 (0.05)	0.76	0.60

Sources: Derived from table 1 data. Other specific sources are given in the text.

a. All equations contain a constant term which is not shown. Equations are estimated by an iterative Cochrane-Orcutt method. The dependent variable is multiplied by 100 to state rates of return as percentages. The numbers in parentheses are standard errors.

b. r^N and r^G are net and gross rates of return, respectively.

c. *CU* and *CUW* are the Federal Reserve Board and Wharton indexes of capacity utilization in manufacturing, respectively; *GAP* is the percent shortfall of actual GNP below potential GNP.

cients are reduced slightly and remain not significantly different from zero, but the estimates are also not inconsistent with an economically important trend.

The Wharton capacity utilization measure (*CUW*) is conceptually different from the Federal Reserve Board index.[19] It is based on a comparison of actual and potential output in manufacturing, estimated by interpolating between peaks. Despite this difference in construction, equations 2.5 and 2.6 show results that are very similar to those obtained with the Federal Reserve Board measure.

Since manufacturing accounts for only about 55 percent of the profits of all nonfinancial corporations, the measures of capacity utilization in manufacturing may be unduly narrow. The "GNP gap" (*GAP*), in contrast, covers the entire economy and may therefore be inappropriately broad.[20] But it has the advantage that it does not reflect the subjective assessments of businessmen as the FRB index does and does not require the rather arbitrary linear peak-to-peak measures of capacity output of the Wharton measure. Introducing the gap variable in equations 2.7 and 2.8 almost completely eliminates the effect of the trend. For the net return, the coefficient is reduced from −0.14 to −0.07; the standard error of this small coefficient is 0.08. For the gross return, the coefficient is reduced to −0.02 with a standard error of 0.06. While a 95 percent confidence interval still contains some quite substantial negative values, a more skeptical judge would probably conclude that there is no reason to reject the conventional view that the cyclically corrected profit rate varies randomly from year to year but without any trend.

Equations 2.7 and 2.8 can be used to estimate the changes in r^N and r^G that are not caused by cyclical changes in the pressure on capacity. For example, in 1976 the gap variable indicated that actual GNP was only 93 percent of potential. Multiplying the shortfall of 7 percentage points by the coefficient 0.34 implies that the net rate of return would have been 2.38 percentage points higher in 1976 if the economy had been operating at full capacity. This translates the observed 7.9 percent value of r^N into a cyclically adjusted value of 10.28 percent. Cyclically adjusted net and

19. The Wharton measure is described in F. Gerard Adams and Robert Summers, "The Wharton Indexes of Capacity Utilization: A Ten Year Perspective," in American Statistical Association, *1973 Proceedings of the Business and Economic Statistics Section* (1974), pp. 67–72.

20. The GNP gap is the proportion of potential GNP that is not realized. The value of potential GNP is estimated by the Council of Economic Advisers.

gross rates of return for all years are presented in columns 3 and 4 of table 1.

Has the Rate of Return Fallen?

Although there is little statistical support for the proposition of a *gradual* downtrend in the rate of return, this does not eliminate the possibility of a recent drop in the rate of return to a new, permanently lower, level. The year 1970 appears in the statistics to mark the beginning of this new "low return" period. Between 1969 and 1970 there was an unprecedented drop in the net rate of return, from 10.2 percent to 8.1 percent, at that time the lowest rate in the postwar period. Although the rate rose to 9.2 percent in 1972, it then plummeted to 6.4 percent in 1974. The recovery to 7.9 percent in 1976 still leaves r^N substantially below the postwar average.

The behavior of the gross rate of return was similar but less dramatic. Between 1969 and 1970, r^G dropped from 11.1 percent to 9.7 percent, a level reached only once before in the postwar period. It then declined to a low of 8.4 percent in 1974 before returning to 9.7 percent in 1976.

The low rate of return in the 1970s raises three distinct questions. First, has there really been a statistically significant fall in the rate of return, or is the experience of the past few years consistent with the combined effect of random variations and cyclical fluctuations experienced in earlier years? Second, if there has been a significant fall in the rate of return, is it likely to be permanent? And, third, if special conditions caused a low rate of return in the 1970s, how does that alter the inference about a gradual downtrend in the rate of return?

Several unique features of the 1970s might make the behavior of the rate of return differ from previous experience. The most obvious are (1) price and wage controls, (2) the oil embargo and jump in energy prices, and (3) the very rapid rate of inflation. Price controls not only limited profits directly but also contributed to shortages that cut profits even more. The oil embargo caused further shortages and the jump in energy costs meant that the existing capital was not optimal for current relative input prices. While this development may have raised the return on new equipment, it lowered that on old equipment valued at replacement cost. Some observers believe that the rapid rate of inflation led to a fall in economic profits because current accounting methods caused firms to overestimate accounting profits and therefore to set prices inappropriately.

Table 3 presents some statistical evidence on the question of whether the 1970s have been different from earlier years in the sample. Equation 3.1 adds a dummy variable equal to 1 for the years 1970 through 1976 (*70DUM*) to the basic equation for r^N. The coefficient of this dummy variable is -1.61, implying that the rate of return has averaged 1.6 percentage points lower during the 1970s than in the previous period, even after adjusting for the low level of capacity utilization. Equation 3.2 shows a similar effect for the gross rate of return. The coefficient of *70DUM* implies that the gross rate of return was 1.3 percentage points lower during the 1970s than in the previous period, again with a correction for the cyclical variation in capacity utilization. The conventional interpretation of the standard errors implies that these coefficients differ from zero in a marginally significant way. Using the GNP gap instead of the Federal Reserve Board index to measure capacity utilization (equations 3.3 and 3.4) lowers the coefficients slightly but does not change the general character of the results.[21]

The evidence thus indicates that 1970–76 has generally been a period of unusually low rates of return even after adjustment for the cyclically low rates of capacity utilization. It would indeed be surprising if the combination of controls, the oil embargo, the jump in energy prices, and the unprecedented inflation did not depress the rate of return. However, the substantial standard errors imply that the estimated differences in the rates of return may be consistent with the types of random fluctuations observed in the earlier years. Stated somewhat differently, although some of the observed rates of return have been lower during the past six years than in any previous postwar year, this may be the result of low capacity utilization coinciding with the adverse random fluctuations experienced in other years. It is interesting in this regard that the substantial fall in both the net and gross rates of return between 1969 and 1970 was less than the fall predicted by equations 2.3 and 2.4 without the special *70DUM* variable. Only the very low rates of 1974 are substantially below the fitted values of these equations.[22] Moreover, in considering the statistical significance of the difference between recent and previous rates of return it

21. The results are similar when the Wharton capacity-utilization variable is used. We also tested the related hypothesis of a change in the time trend in 1970 instead of a shift in the level; the coefficient of this supplementary trend variable was small (-0.02 for the r^N equation) and not significantly different from zero.

22. If equations 3.1 through 3.4 are reestimated without the year 1974, the coefficients of *70DUM* are reduced and the t statistics fall to approximately 1.4.

Table 3. The Rate of Return on Nonfinancial Corporate Capital in the 1970s[a]

		Independent variable[c]				Regression statistic	
Equation	*Dependent variable*[b]	*Time*	*CU*	*GAP*	*70DUM*	ρ	*Standard error*
3.1	r^N	−0.05 (0.07)	0.15 (0.04)	...	−1.61 (0.98)	0.63	0.89
3.2	r^G	0.00 (0.05)	0.09 (0.03)	...	−1.27 (0.66)	0.60	0.61
3.3	r^N	−0.01 (0.07)	...	0.30 (0.07)	−1.58 (0.97)	0.65	0.87
3.4	r^G	0.03 (0.05)	...	0.19 (0.05)	−1.21 (0.64)	0.63	0.58
3.5	r^N	−0.03 (0.10)	0.19 (0.04)	...	...	0.71	0.80
3.6	r^G	0.02 (0.06)	0.12 (0.03)	...	...	0.69	0.51
3.7	r^N	0.02 (0.10)	...	...	...	0.58	1.16
3.8	r^G	0.06 (0.06)	...	...	...	0.56	0.73

Sources: Derived from table 1 data.

a. Equations 3.1 to 3.4 have been estimated for 1949–76 and equations 3.5 to 3.8 for 1949–69. All equations contain a constant term which is not shown. Equations are estimated by an iterative Cochrane-Orcutt method. The dependent variable is multiplied by 100 to state rates of return as percentages. The numbers in parentheses are standard errors.

b. r^N and r^G are net and gross rates of return, respectively.

c. *CU* and *GAP* are as defined in table 2; *70DUM* is equal to 1 for 1970–76, zero in all other years.

is important to bear in mind that the period 1970–76 was selected on the basis of the *observed* low rates of return and not on the basis of a priori considerations. Such "post-data model construction," to use Edward Leamer's term, obviously imparts a bias to conventional test procedures.[23]

Nothing suggests that the recent low rate of return represents a *permanent* fall. Of the reasons for the fall that we listed above, the only one that has persisted is the inappropriateness of existing equipment for the current relative input prices, a factor that will gradually correct itself and that adversely influences the average rather than the marginal rates of return. All the others were temporary conditions. Other influences may have contributed to the low rates during the first half of the 1970s and may persist. Only time will tell. But it is interesting to note that the equations for r^N and r^G without the *70DUM* variable (equations 2.3 and 2.4) now predict values for 1976 that are within 0.1 percentage point of the actual values.[24]

Equations 3.1 through 3.4 show that the estimated time trends shown in table 2 were really a reflection of the low rates of return during the most recent years rather than a general downtrend. With *70DUM* included in all of the equations, the trend coefficients are insignificantly different from zero. This is confirmed by the estimates for the period 1949–69 presented in equations 3.5 through 3.8. Omitting the most recent years eliminates all traces of a downward trend. If the possibility of a declining trend had been suggested seven years ago, the regressions in equations 3.5 through 3.8 would have provided strong counterevidence. It is instructive that the idea of a downtrend was not suggested then but only after a decline had been observed for several years. Any estimate of a decline through the mid-1970s is now suspect as an example of "post-data model construction."

23. Edward E. Leamer, "False Models and Post-Data Model Construction," *Journal of the American Statistical Association*, vol. 69 (March 1974), pp. 122–31.

24. Although it is not possible to separate the effects of the several factors that contributed to the recent fall in the rates of return, we did try to evaluate the argument that actual profits have been low because conventional accounting practices with respect to depreciation and inventories caused firms to overestimate their profitability. Actual profitability based on economic depreciation and adjusted for changes in inventory values averaged 1.3 percent below accounting profitability in the period 1970–76, reaching a maximum difference of 3.1 percent in 1974. When this profitability-error variable was added to equation 3.3, its coefficient was small (−0.19) and less than its standard error. In other specifications and subperiods the coefficient behaved erratically and generally implausibly.

Conclusion

In this paper we have used the newly revised national income accounts and estimates of the capital stock to calculate the pretax rates of return on nonfinancial corporate capital for each year from 1948 through 1976. Our analysis of these rates of return provides no support for the view that there has been a gradual decline in the rate of return over the postwar period. The evidence does suggest that the average rate of return since 1970 has been some 1 to 2 percent lower than would be predicted on the basis of the low recent capacity utilization alone. But the shortfalls that remain after adjusting for capacity utilization are not inconsistent with the type of random year-to-year fluctuations in profitability that have been observed previously. In any case, the factors that contributed to the fall in the return during the early 1970s are likely to be transitory so that the fall in the return is itself likely to be temporary.

For the entire period since 1948, the average pretax rate of return is 10.6 percent if profits and the capital stock are measured net of depreciation, and 11.0 percent considering gross profits and capital stock measured net of scrapping. If attention is limited to the period before 1970, the corresponding average rates of return were both 11.5 percent. It should be borne in mind that these rates of return relate to nonfinancial corporations and not to the entire capital stock. In considering the return that is now available on new investment, it should also be realized that the recent rapid changes in relative input prices, especially the price of energy, depress the calculated return on existing assets without causing a corresponding reduction in the return on new assets.

APPENDIX

The Profit Rate and the Internal Rate of Return

THE RATE of profit provides a measure of the "social rate of return" on an additional unit of capital invested in the nonfinancial corporate sector. More precisely, this appendix demonstrates that the two rates of profit discussed in the text, r^N and r^G, are in principle equal to the internal rate of return on a marginal investment under special technological assumptions about the decay of capital productivity. Although these technological assumptions represent polar cases, they do shed light on the proper interpretation of estimates of the profit rate.

The "social rate of return" is best regarded as the rate at which forgone current consumption can be transformed into future consumption. The social rate of return is thus equal to the internal rate of return that reduces the present value of the output of the marginal investment to its initial cost. Note that this internal rate of return depends only on the value of the actual inputs and outputs and not on "depreciation" since depreciation is an accounting measure rather than an actual input. More specifically, if the marginal dollar of investment at time $t = 0$ produces net output $a(t)$ at time t, the internal rate of return is defined by r in this equation:

(A-1) $$\int_0^\infty a(t)\, e^{-rt}\, dt = 1.$$

Consider now the special case of exponential decay of net output—$a(t) = ae^{-\delta t}$. Net output falls with time because gross output of the equipment is less ("output decay") or the real value of resources required to operate the investment rises ("input decay").[25] In this case the internal rate of return (r) satisfies

(A-2) $$\int_0^\infty ae^{-(\delta+r)t}\, dt = 1$$

or

(A-3) $$r = a - \delta.$$

It is easy to show that with exponential decay this internal rate of return (r) corresponds to the concept of the net profit rate (r^N) used in the text. The operational definition of r^N in equation 1 can be written as

(A-4) $$r^N = \frac{\text{net output} - \text{depreciation}}{\text{net capital stock}}.$$

With exponential decay, the value of the capital stock (K^N) must be such that aggregate net output is aK^N—that is, all capital is valued in propor-

25. The concepts of output and input decay are discussed and contrasted with the notion of depreciation in Martin Feldstein and Michael Rothschild, "Towards an Economic Theory of Replacement Investment," *Econometrica*, vol. 42 (May 1974), pp. 393–423.

tion to its output. The value of the capital stock falls at the rate of output decay; thus depreciation equals δK^N. Substituting into A-4 yields

$$\text{(A-5)} \qquad r^N = \frac{aK^N - \delta K^N}{K^N} = a - \delta = r.$$

Thus in the case of exponential decay, the net rate of profit (r^N) is the proper measure of the social rate of return on additional capital.

The other extreme special case is the "one-hoss shay" technology in which capital remains intact and produces the initial net output until age T, when it suddenly stops producing at all. The social rate of return (r) is given by

$$\text{(A-6)} \qquad \int_0^T ae^{-rt}\,dt = 1.$$

Integrating yields

$$\text{(A-7)} \qquad r = a\,(1-e^{-rT}).$$

If assets are long-lived, the second part of the right-hand side is negligible and $r = a$; for example, with $T = 25$ years and $a = 0.12$, equation A-7 implies $r = 0.113$.

The text defines the gross rate of return as

$$\text{(A-8)} \qquad r^G = \frac{\text{net output}}{\text{gross capital stock}}.$$

Since each unit of capital produces a units of output until it is scrapped, net output is aK^G, where K^G is the gross capital stock. Thus

$$\text{(A-9)} \qquad r^G = \frac{aK^G}{K^G} = a.$$

Thus $r^G = r$ in the case of long-lived assets subject to this type of decay.

As table 1 of the text illustrates, the divergence between the estimated values of r^G and r^N is relatively minor. This leads us to suspect that the measurement of the estimated return on additional capital is not overly sensitive to the assumptions about depreciation.

Discussion

MICHAEL WACHTER thought it would have been interesting to do a breakdown of the rates of return between the manufacturing and the nonmanufacturing sectors. He suspected that such a disaggregation might show a significant decline for manufacturing in the seventies.

Pentti Kouri said that declining rates of return to capital had been experienced in other countries, and attributed them to increasing competition in international commodity markets, decreasing competition in labor markets, and a squeeze on profits from the rise in the prices of raw materials and energy. He noted that the recent inflow of direct investment into the United States offered some indirect support for the Feldstein-Summers conclusions; it suggested that the return was now higher in the United States than abroad. Martin Feldstein cautioned that international capital flows respond to net after-tax rates of return; hence, tax effects would have to be dealt with before such a proposition could be assessed.

Joseph Pechman questioned how one could be agnostic, as the authors seemed to be, on whether rates of return were higher in the corporate or the noncorporate sector. Pechman believed that noncorporate rates of return were much lower mainly because of the farm sector, which has very low rates of return to physical capital. Edward Denison supported Pechman's view; but Feldstein noted that there were substantial difficulties associated with valuing land.